NW-P029

Oxidative Line Width Reduction of Imprinted Nanopatterns

Dae Keun Park[1], Aeyeon Kang[1], Mira Jeong[2], Jaejong Lee[2], Wan Soo Yun[1]*

[1]Department of Chemistry, Sungkyunkwan University (SKKU), Suwon 440-746,
[2]Korea Institute of Machinery and Materials (KIMM), Daejeon 305-343, Korea

Although imprinted nanopatterns of organic polymer can be modified by the heat treatment [1], it generally requires high process temperatures and is material-dependent since the heat-induced mass loss of the organic polymer is greatly affected by its chemical characteristics. When oxygen is added during the annealing process, one can reduce the process temperature as well as the dependence of the materials. With the oxygen, line width reduction of a polymer (SU-8) patterns could be accomplished at temperature of as low as 250°C which was not possible in the heat only process. This oxidative line width reduction can be dramatically promoted with the introduction of oxygen plasma. The oxygen plasma, with its highly-reactive oxygen species, vigorously etches away the organic materials, proven to be extremely effective line with reduction method. It is, however, very hard to control the extent and homogeneity of the etching, particularly of very fine patterns. Here, we report an effective and reliable line width reduction method of imprinted nanopatterns by combined plasma and heat treatment. The merits of this process include the reduction of process temperature, time and material-dependence.

Refrence

[1] ACS NANO, 2011, 5(2), 923-931.

Keywords: Line width reduction, Oxidative modification, Imprinted nanopattern